

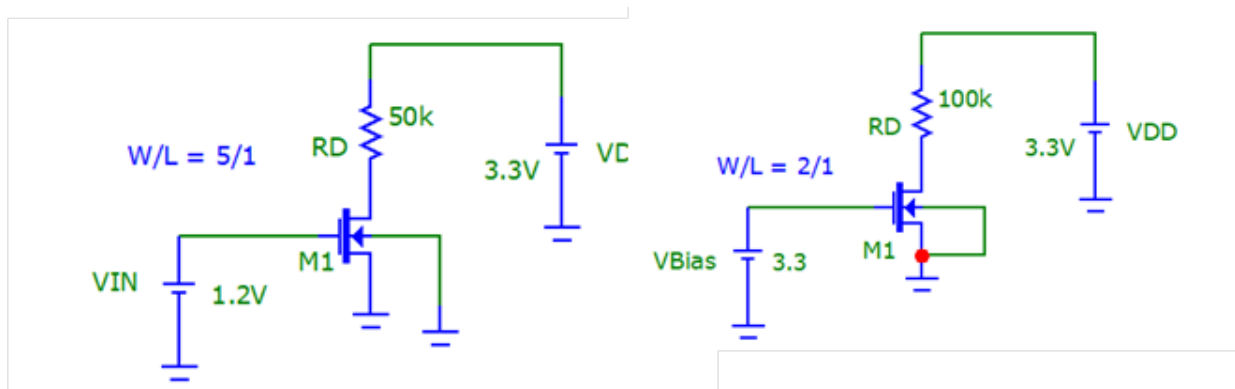
ESC201T: Introduction to Electronics

HW -9

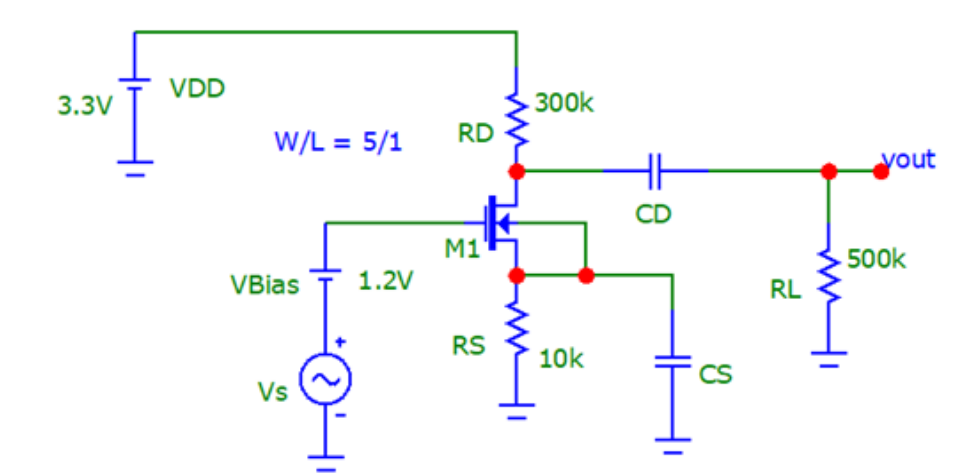
Date: 10.11.2020

Q.1 Determine the drain current and drain-source voltage for the two circuits shown below.

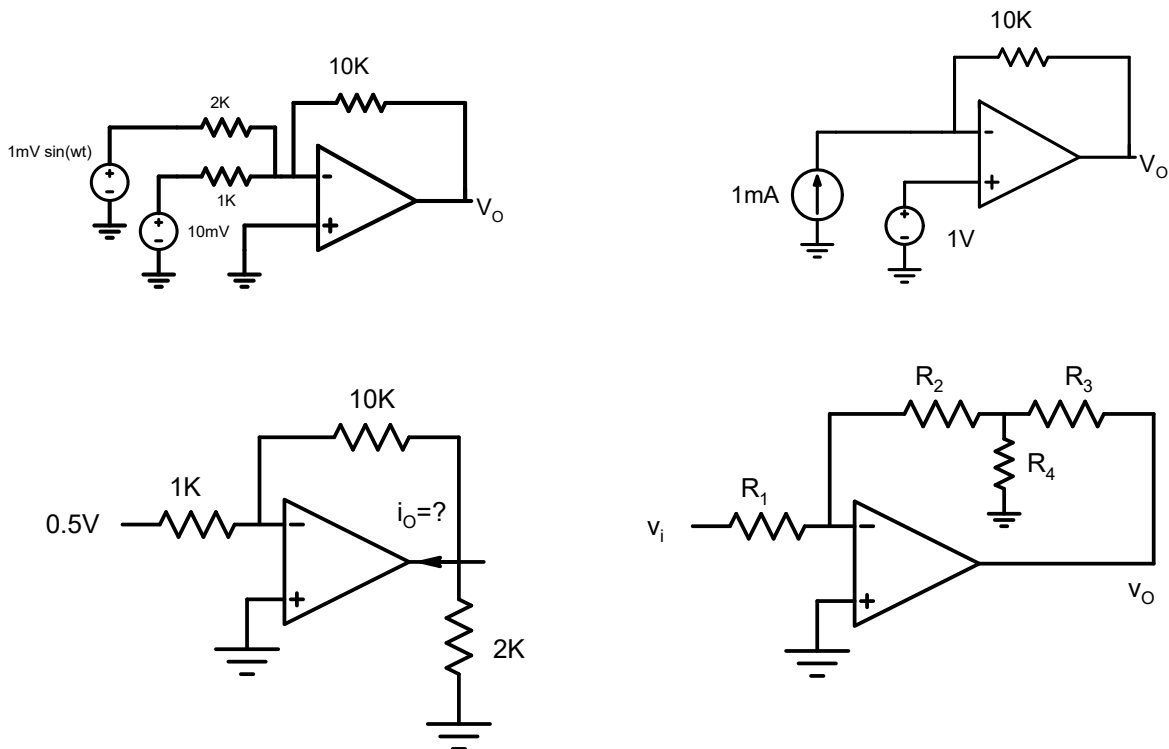
Assume that $KP_N = 100\mu A/V^2$; $V_{THN} = 1V$; $\lambda_n = 0V^{-1}$



Q.2 Analyze the circuit shown below to determine the voltage gain of the amplifier. Determine the gain if the capacitor is removed from the circuit. Assume the same MOS parameters as in Q.1



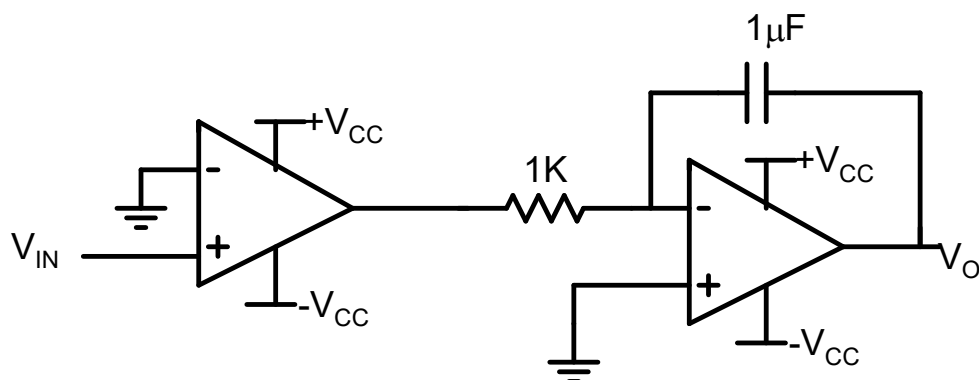
Q.3 Determine the output of the ideal opamp circuits shown below



Q.4 Design an opamp circuit that would generate the following output voltage $V_O = 2v_{s1} + 4v_{s2} - 8v_{s3} - 10v_{s4}$ where V_{s1} , V_{s2} , V_{s3} and V_{s4} are input voltages.

Q.5 Design an opamp circuit that can produce $V_O = K \times V_{IN}^2$ where V_{in} is the input voltage.

Q.6 Sketch the output voltage of the circuit shown below for $V_{in} = 1V \sin(2\pi ft)$; $f = 1KHz$ and supply voltages of $\pm 5V$



Q.7 Determine the output for the ideal opamp circuits shown below. For the circuit on the right assume that diodes have cut-in voltage of 0.7V. Analyze the circuit for $V_s = 1V$ and $V_s = -1V$. For the transistor assume a current gain of 100. What is the usefulness of each of the circuits?

